

## 14.

Eastern Pacific Expeditions of the New York  
Zoological Society. XXIV.

Fishes from the Tropical Eastern Pacific.  
[From Cedros Island, Lower California, South to the Galápagos  
Islands and Northern Peru.]

Part 1. Lancelets and Hag-fishes.<sup>1</sup>

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(Text-figures 1 & 2).

[This is the twenty-fourth of a series of papers dealing with the collections of the Eastern Pacific Expeditions of the New York Zoological Society made under the direction of Dr. William Beebe. The present paper is concerned with specimens taken on the Templeton Crocker Expedition (1936), and the Eastern Pacific Zaca Expedition (1937-1938). For data on localities, dates, dredges, etc., of these two expeditions, refer to *Zoologica*, 22: 33-46 (Templeton Crocker) and *Zoologica*, 23: 278-298 (Eastern Pacific Zaca).]

This series of papers on fishes and fish-like animals will list the species known from the region; those represented by specimens taken on our own expeditions will be treated more extensively. As far as the unrepresented forms are concerned, field characters, size, original and regional references, and whenever possible an illustration, are given for each species.

CLASS LEPTOCARDII.

Order Cirrostomi.

Family BRANCHIOSTOMIDAE.

*Branchiostoma* Costa, 1834.

KEY TO TROPICAL EASTERN PACIFIC SPECIES.

- 1a. 68 to 74 myotomes (California to Panama).  
.....*californiense*.  
1b. 78 to 81 myotomes (Peru, Chile and the Galapagos Islands (Albemarle)). . . . .*elongatum*.

*Branchiostoma californiense* Andrews.



<sup>1</sup> Contribution No. 621, Department of Tropical Research, New York Zoological Society.

*Range:* Monterey Bay, California, to Chame Point, Panama, in sand from depths of one foot to thirty-five fathoms. (Mexico: San Luis Gonzales Bay and Arena Bank, Gulf of California, Cape San Lucas; Nicaragua: Corinto; Costa Rica: Piedra Blanca Bay and Gulf of Dulce; Panama: Chame Point.)

*Description:* Dorsal ray-chambers 312 to 374 (average 337); preanal chambers about 50; higher dorsal chambers five to eight times as high as long; dorsal fin one-fifth to one-eighth as high as body; anus located far behind middle of lower lobe of caudal fin; distance from atriopore to origin of lower caudal lobe contained from .8 to 2 times in distance thence to anus; preatrioporal length 2.65 to 3.3 times the postatrioporal length; myotome formula 43 to 48 + 16 to 19 + 8 to 10 = 68 to 74; gonad pouches 27 to 36 (average 33); distance from tip of rostral fin to anal sphincter 13.8 to 16.3 times in total length. (Description from Hubbs, 1922; as our specimens are immature. Illustration from specimen 25,482a, 29.4 mm.)

*Color:* Creamy white; several of our specimens showed a conspicuous brown band across the center of the snout.

*Size:* Mature specimens 58 to 83.5 mm., our immature individuals were 17 to 48.8 mm.

*Local Distribution:* Our specimens were dredged in sand beneath depths of water ranging from 12 inches to 210 feet. This latter record of 35 fathoms on Arena Bank is the deepest known, 6.5 fathoms being the deepest hitherto recorded.

*Abundance:* The nine specimens were dredged in four widely separated localities. The species is doubtless to be found in all suitable localities throughout the range under discussion.

*Food:* A dark area in the intestine of an

Amphioxus from the Gulf of Dulce, Costa Rica, resolved into a mass of diatoms of several species.

**Breeding:** All of our specimens are immature; they present, however, the recognizable characters of *californiense*. The 48.8 mm. individual from 35 fathoms had 358 dorsal ray-chambers and was quite free of gonads, while its 37 mm. companion from the same haul showed 31 gonads.

**Study Material:** 9 specimens. Mexico: Arena Bank, Lower California, Station 136:D-30, 35 fathoms, 4 (25,482), 20 to 48.8 mm., May 1, 1936, dredged; Nicaragua: Corinto Harbor, Station 200:D-22, 1.5 fathoms, 2 (27,700), 17 and 24 mm., Jan. 7, 1938; Costa Rica: Piedra Blanca, Station 218:D-2, 5 fathoms, 2 (28,211) 19 and 30 mm., Feb. 5, 1938, dredged; Gofito, Gulf of Dulce, 12 inches deep, 1 (28,649), 36 mm., March 6, 1938, sifted from sand in shallow tidal stream.

**References:** *Branchiostoma* sp., Cooper, J. G., in Cronise, T. F., Natural Wealth of California, 1868: 498 (First mention of a branchiostomid on Pacific Coast).

*Branchiostoma lanceolatum*, Lockington, W. N., *Proc. Acad. Nat. Sci., Phila.*, 1881 (1882): 114 (Angeles Bay, Lower California). Pellegrin, J., *Bull. Mus. Hist. Nat. Paris*, 7, 1901: 163, 167 (Several specimens 55-65 mm., from Los Angeles Bay, Lower California).

*Branchiostoma californiense*, Andrews, E. A., *Studies Biol. Laboratory Johns Hopkins Univers.*, 5, 1893: 238 (San Diego, California). Jordan, D. S. & Evermann, B. W., *Fishes North and Middle America*, 1, 1896: 4 (San Luis Gonzales Bay, Gulf of California). Hubbs, C. L., *Occ. Pap. Mus. Zool., Univ. Michigan*, 105, 1922: 11 (redescription of species). Meek, S. E. & Hildebrand, S. F., *Marine Fishes of Panama*, 1, 1923: 28 (Range extended to Chame Point, Panama; 61 specimens 20 to 37 mm., "tentatively referred to this species in the absence of comparative material"). Ulrey, A. B., *Journ. Pan-Pac. Res. Inst.*, 4 (4) 1929: 2 (Cape San Lucas, Gulf of California).

**Discussion:** The California Amphioxus, *Branchiostoma californiense*, presents an interesting comparison with three species of the western Atlantic, *virginiae*, *floridiae* and *caribaeum*. Its maximum length is one-third (34%) greater than the average of the other three. It shows a decided increase in four categories of metameral characters: dorsal ray chambers 16%, preanal chambers 25%, myotomes 18% and gonads 24%. That this is not wholly the result of a larger organism in general (55 as compared with 83.5 mm. in maximum length) is proved by a corresponding comparison of the three Atlantic species with *elongatum*, which replaces *californiense* from the Galápagos to Chili. The percentage of the maximum length of this more southern form is only 20% over the Atlantic species, but in preanal ray-chambers it is 46% numerically superior, in myotomes 27%, while it possesses 32% more gonads than the Atlantic species.

### *Branchiostoma elongatum* (Sundevall).

**Range:** Peru (Chincha Islands), Chile and the Galápagos Islands (Albemarle).

**Description:** Dorsal ray-chambers numerous, but not accurately countable, and moderately high; preanal chambers about 65 to 75, much more numerous than in other species of *Branchiostoma*; anus located slightly in advance of middle of lower caudal lobe; distance of atriopore to origin of this fin lobe contained 1.3 times in total distance behind this point. Preatrioporal length 2.4 to 2.6 times the postatrioporal length; myotomes very oblique; the formula 48 to 51 + 18 + 12 or 13 = 79 to 81. Gonad pouches 37; oral hood reduced in size, as in *B. californiense*. (Hubbs, 1922: 13.)

**Study Material:** None.

**References:** *Amphioxus elongatus*, Sundevall, C. J., *Oefvers. Vet. Akad. Forh.*, 9, 1852: 147 (description; type locality, Chincha Islands, Peru). Kirkaldy, J. W., *Quart. Journ. Microsc. Sci.*, 37, 1895: 303.

*Branchiostoma elongatum*, Sundevall, C. J., *Oefvers. Vet. Akad. Forh.*, 10, 1853: 12 (Chincha Islands, Peru). Steindachner, F., *Fauna Chilensis*, 1898: 334 (Cavancha Bay, Iquique, Chile). Herdman, W. A., *Cambridge Nat. Hist.*, 7, 1904: 137 (Myotomes 49-18-12, Peru). Snodgrass, R. E. & Heller, E., *Proc. Wash. Acad. Sci.*, 6, 1905: 342 (Galápagos Islands, 13 specimens, the largest 20 mm.). Goldschmidt, R., *Zool. Anz.*, 29, 1905: 132-133 (Peru). Hubbs, C. L., *Occ. Pap. Mus. Zool., Univ. Mich.*, 105, 1922: 13 (diagnosis).

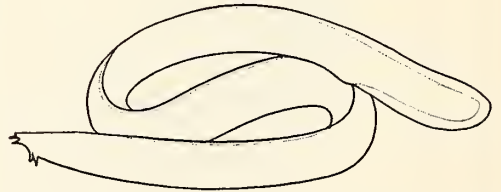
## Class CYCLOSTOMI.

### Order Hyperotreta.

#### Family MYXINIDAE.

#### *Myxine* Linnaeus, 1758.

#### *Myxine circifrons* Garman.



**Range:** Gulf of Panama; known from 20 miles W. × S. of Caracoles Point, in 730 fathoms.

**Field Characters:** Eel-shaped eyeless animals with a series of barbels about the mouth. Upper teeth 13 on each side, lower teeth 11 on each side, of which the anterior three of each upper and the anterior two of each lower series are confluent.

Color uniform black; head lighter anteriorly.  
(Illustration after Garman, 1899; 470 mm.)

*Size:* Grows to 18½ inches.

*Study Material:* None.

*References:* *Myxine circifrons*, *Mem. Mus.*

*Comp. Zool.*, 24, 1899: 344, Plate 68, figs. 1-4  
(original description, color, figures of entire  
animal, head, heart and gills; type-locality,  
*Albatross* station 2395, 7° 30' 36'' N., 78° 39' W.,  
Gulf of Panama in 730 fathoms. Type in Mus.  
*Comp. Zool.*).